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The geo-spatial analysis and environmental factors of narcotics hot spots

Stefanie Wrae Balchak

THE GEO-SPATIAL ANALYSIS AND ENVIRONMENTAL FACTORS OF NARCOTICS HOT SPOTS

A Thesis

Presented to the

Faculty of

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San Bernardino

In Partial Fulfillment

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in

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ABSTRACT

A mixed methodological approach with two different analytic procedures and multiple data sources was used to examine narcotics hot spots. The first phase compares two methods of hot spots identification; the prediction model and the actual crime. The second phase involves an intensive study to better understand the phenomenon of drug hot spots areas consistently shown to be repeat hotspots.

The findings themselves were not statistically significant in reference to the individual indicators of narcotics crime, the prediction model, nor the repeat versus single call incidents. However, the model itself generated interesting ideas that can assist police agencies in better preventing or controlling narcotics activity.

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Thank you so much...

To my mom and dad, sisters and friends for all the hard times, the support, and believing in me. I love you all for encouraging and hounding me to finish.

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CHAPTER ONE

INTRODUCTION

Over the past twenty years much thought and practice have gone into the analysis of narcotics activity. Within the last fifteen years the focus has leaned towards the factors in the environment rather than the behavior of offenders. Environmental factors can create an atmosphere that is "narcotics friendly" or "narcotics resisting". Through previous studies many environmental indicators of narcotics activity have been identified.

Identifying factors conducive to high levels of narcotics activity requires a mixed methodological approach with two different analytic procedures and multiple data sources. The first research phase involves comparing two methods of hot spot identification. Computer assisted identification using (a) narcotics calls for service (CFS), and (b) a prediction model based on correlates (variables linked to narcotics activity) identified through prior research. This study used three geographic indices to measure social structure, activity patterns, and crime attractors. Cumulative scores were converted to grid and assigned a value based on the presence within each grid.

The higher the presence the more likely that a hot spot (high activity concentration) would surface. Areas consistently shown to be hotspots were subject to intensive study to better understand the phenomenon of drug hot spots. Drawing from prior literature, this study tested which environmental factors are most highly correlated with narcotics activity.

The second phase is a comparison of repeat and single narcotic incident locations. The locations were examined for environmental factors that may influence or create a narcotics friendly area. Repeat locations were expected to have higher levels of the environmental factors than the single incident locations.

In Chapter 2, indicators of narcotics activity are described and prior research on is introduced. The methodological aspect of the study is mapped out and discussed for each step of both phases in Chapter 3. Chapter four explores the mapped indices of phase 1 and the statistical findings of phase 2 followed by a discussion of each. And finally, Chapter 5 offers conclusions, implications, and limitations of the two phases as well as future aspirations for continued research.

The findings themselves were not statistically significant in reference to the individual indicators of narcotics crime, the prediction model, nor even the repeat versus single call incidents. However, the model itself generated interesting ideas that can aid police agencies in better preventing or controlling narcotics activity. This leads to the possibility of predicting movement of narcotics hot spots over time. Another positive would be putting into place preventative measures to combat narcotics activity in areas that are prone rather than wasting resources throughout the city.

CHAPTER TWO

PRIOR RESEARCH

Over the past twenty years much thought and practice have gone into the analysis of narcotics activity. Within the last fifteen years the focus has leaned towards the factors in the environment rather than the behavior of offenders. Environmental factors can create an atmosphere that is "narcotics friendly" or "narcotics resisting".

Along with the physical factors there are social and activity influences that merge to create a narcotics friendly atmosphere. The physical factors include housing structure type (Eck, 1994, Hope, 1994;Weisburd & Mazerolle, 2000), presence of liquor establishments (Block and Block, 1995; Green, 1995), place management (Block and Block, 1995; Eck, 1994; Eck and Wartell, 1998; Green, 1995; Hope, 1994; Lurigio et al., 1998; Mazerolle et al., 1998; Mazerolle et al., 2000), and payphones (Eck, 1994; Mazerolle et al., 1998; Mazerolle et al., 2000). Social factors would include population density (Hope, 1994; Lurigio et al., 1998; Weisburd & Mazerolle, 2000), social economic status (Eck, 1995; Lurigio et al., 1998; Weisburd & Mazerolle, 2000), concentration of minorities (Hope,

1994; Lurigio et al., 1998; Weisburd & Mazerolle, 2000), gangs (Lurigio et al., 1998), place attachment (Eck, 1994), and vacant housing (Hope, 1994). Activity patterns would include bus stops (Eck, 1994; Loukaitou-Sideris, 1999; Mazerolle et al., 1998) and arterial routes (Eck, 1994; Eck, 1995; Weisburd and Green-Mazerolle, 1995 & 2000). These factors that have been identified by prior research should pinpoint problem narcotics areas.

Further research examining drug markets and narcotics activity is required to find ways to discourage these actions. Prior research has identified variables that are common in narcotics areas. Predicting these areas before they become hot spots would be beneficial in terms of preventative measures. Expectations are that a predication model can be created to identify these narcotics hot spot areas.

Market Location Characteristics

Researchers have found through numerous studies (see Appendix A), environmental characteristics that can make an area prone to narcotics activity, such as: multi-housing units (Eck, 1994; Mazerolle et al., 1998 and 2000; Weisburd & Mazerolle, 2000), concentration of minorities (Hope,

1994; Lurigio et al., 1998; Weisburd & Mazerolle, 2000), proximity to liquor establishments (Block & Block, 1995; Green, 1995), proximity to payphones (Eck, 1994; Mazerolle et al., 1998 & 2000), and gangs (Lurigio et al., 1998). Various geographic places have proven these characteristics are reliable identifiers of narcotics or not depending on the different areas (see Appendix A). Since each area is different physically and socially, not all identifiers will be true of all areas but each area should have some of the characteristics.

Narcotics Indicators

Arterial Routes. According to Eck, (1995) key patterns to the development and movement of drug markets subsequent to police intervention, suggest the importance of situational factors and routine activities. Not only do illicit retail market places tend to be clustered along arterial routes or around nodes of routine legitimate services, but also, the arterials and nodes with illicit marketplaces clustered around them should be in economically depressed areas.

Weisburd and Green-Mazerolle (1995, 2000) found a spatial linkage with street segments and intersections w/in drug hot spots. This combination was also more likely to

experience crime and disorder problems compared to non-drug hot spot areas.

Bus Stops. Bus stops were a frequent feature in drug areas (Eck, 1995) and many males were seen at the bus stop hanging around (Mazerolle et al., 1998). In a Los Angeles, CA study of bus stops, 6 out of 10 bus stops were observed to have been involved in narcotics activity (Loukaitou-Sideris, 1999). With increased movement of people and little to no place management, narcotics activity is able to thrive with little detection.

Gangs. The presence of gangs (graffiti, people hanging out in the streets, etc.) has been a noted sign of narcotics activity. Lurigio et al, (1998) observed the physical appearance and maintenance of the sites; signs of drug dealing; presence of gangs and the character of social life at each of the abated properties and its block in Cook County as signs of narcotics use. The population and income status characteristics of each site block were also noted.

Signs indicating neighborhood organization were posted warning against public drinking, drug dealing and rowdiness (Lurigio et al, 1998). Groups of youths and young adults were congregating or otherwise occupying the streets;

involved in verbal banter, jousting and drinking as well as being rowdy and threatening while some adults appeared to go out of their way to avoid these young people (Lurigio et al, 1998). Moderate-to-high levels of gang activity were evidenced in most neighborhoods by graffiti and/or youths wearing gang colors (Lurigio et al, 1998).

Housing Structure. Drug hot spots in Jersey City (Weisburd and Mazerolle, 2000) had fewer single-family homes, fewer homes owned by residents. They concluded that street-level drug hot spot activity, disorder, and more serious crime do indeed cluster together in discrete areas. Disorder is apparent not only in the physical appearance of a neighborhood but also in the social activities that connects residents to each another.

A large number of drug incidents were found to be in large multiple-unit apartment buildings, especially if the complex had locked gates (Eck, 1995). When the apartments were in need of major maintenance, Hope (1994) found that the apartments were being used as drug distribution centers.

Liquor Establishments. Liquor establishments have been coupled with narcotics activity, in that one is related to the other. Block and Block (1995), in Chicago,

found that 88 drug arrests were within a one-block radius of a liquor store. Green (1995) found a significant number of narcotics arrests within three-blocks of a bar or liquor store.

Minority. Drug hot spots in Jersey City (Weisburd and Mazerolle, 2000) had a concentration of minorities. They concluded that street-level drug hot spot activity, disorder, and more serious crime do indeed cluster together in discrete areas. In St. Louis, Hope (1994) found that the area was predominately African-American, as did Lurigio et al. (1998) in Cook County with 50% African-American and 30% Puerto Rican. In areas that are minority dominant and low-income there is a higher chance of narcotics activity.

Payphones. Payphones have become a recognized form of communication for narcotics activity. Mazerolle et al., (1998) found, in Oakland, that high numbers of males used the payphones in the 100-block study area. Then in Jersey City, Mazerolle et al. (2000), found that the payphones made only outgoing calls which meant that buyers could not call the sellers at the payphones. Eck (1994) also found that payphones were a frequent feature in narcotics areas.

Place Attachment. Eck (1995) also found that markets using a routine activity solution would have three other

geographical characteristics, high place attachment, place managers, and large markets with numerous people. If the people of the neighborhood are concerned with the neighborhood and it can be seen that care is put into lawns and upkeep of houses as well as having seating in the front yard for the residents, then there is place attachment. This means that if something should occur in the neighborhood that they believe is not right then they will either do something about it or call to have help with the problem.

Place Management. Place management provides surveillance and ownership to any type of building (Eck, 1994; Eck and Wartell, 1998; Mazerolle et al., 1998). There are several qualities of any property that place management needs to acknowledge, such as, deterioration of buildings, graffiti, abandoned vehicles, blight, and lighting. Each of these if not maintained can change the space and make it more narcotics friendly. Block and Block (1995), Chicago, found that many the drug incidents were located near an elevated station or an expressway interchange, generating high traffic and offering easy access and escape with low surveillance.

Poorly maintained properties were usually found in narcotics areas, trash on the grounds, and code violations from physical decline (Lurigio et al., 1998) were also common (Hope, 1994). With the physical deterioration or lack of ownership in an area or building comes graffiti, sometimes gang related, which can change the feel/ownership of the area (Lurigio et al., 1998). Green (1995) found that if abandoned cars and blight was removed that it changed the users' and activities in the area as did adding lights to a parking lot (Mazerolle et al., 2000).

Population. Drug hot spots in Jersey City (Weisburd and Mazerolle, 2000) found that drug areas have higher population density than non-drug hot spot areas, which is a general component of the broken windows theory. Broken window theory suggests that higher population density contributes to the social decline of neighborhoods (Wilson and Kelling, 1982). Also highly populated areas were found to be influential in Cook County (Lurigio et al., 1998) and Jersey City (Weisburd and Mazerolle, 2000).

Social Economic Status. According to Eck, (1995) a key pattern to the development and movement of drug markets is arterials and nodes with illicit marketplaces clustered around them in economically depressed areas. Drug hot

spots in Jersey City (Weisburd and Mazerolle, 2000) had higher populations of poor people in narcotics areas. Also in Cook County (Lurigio et al., 1998) lower income levels, even working to middle class, were common to the narcotics areas.

Vacant Units. In St. Louis, Hope (1994) found that vacant lots and units provide space for illegal activity since there is no ownership. According to Wilson and Kelling (1982), neighborhood decline is due to a combination of social factors. The broken windows hypothesis suggests that there is a process of decline in urban areas that begins with minor acts of disorder and progresses to more serious crime problems. A gang can weaken or destroy a community by standing about in a menacing fashion and speaking rudely to a passerby without breaking the law until they mark their territory and/or sell drugs (Wilson and Kelling, 1982).

Facilities and Crime

Facilities are special-purpose structures operated for specific functions (Eck and Weisburd, 1995). Examples of place facilities include high schools, taverns, convenience stores, churches, apartment buildings, and public housing projects. Places matter as it pertains to their immediate

environment since different types of facilities increase or decrease crime. As routine activity theory suggests, this occurs because of the way the facility is managed, the desirability and accessibility of targets found in the facility, the likelihood of handlers being at the location, and the level of guardianship found at the site.

Eck and Weisburd (1995) state, that even though facilities may attract offenders onto a block, the variation in crime among blocks with the same facilities suggests that there may be important differences in the social structure of the places that account for differences in crime counts, even when controlling for crime opportunities.

Crime generators and attractors are facilities that provide opportunity for criminal activities (Brantingham and Brantingham, 1995). A crime generator is a place where large numbers of people congregate (i.e. intersections with high traffic nodes, or sports stadiums), offenders are not looking for an opportunity yet one may arise. A crime attracter is a place where criminals go in search of opportunity (i.e. a drug market area).

Rengert and Wasilchick (1990) provide evidence from interviews with burglars that drug-dealing locations (crime

attractor) might draw predatory offenders to an area to purchase drugs. These offenders then may commit predatory crimes in the area surrounding the drug places; providing partial support for the view that places attract offenders for one purpose and then participate in other crimes. Weisburd et al. (1994) found an over-representation of crime calls for a series of crime categories in places that were identified primarily as drug markets. These studies suggest three possible hypotheses: there is something about the place that fosters deviance in the block; the facilities draw people to the block; or both. Some studies suggest that the more access people have to an area or place, the more crime in the area or place (Friedman et al., 1989).

Place Management

There has been a recent focus on the importance of place management of public and semi-public space. Space has both, natural and unnatural guardians to watch over the surrounding area or space. This frame of thought has come about from many sources and theoretical backgrounds.

Originally the routine theory approach took offenders as given, but later work (Felson, 1986) took into account informal social control of offenders. This was

accomplished by linking the routine activity approach to Hirshi's (1969) control theory. There are three types of place managers: guardians, intimate handlers, and managers, which suppress crime.

At first, Cohen and Felson (1979) considered only one crime suppressor, guardianship. Guardianship protects targets from offenders when the offender and target are in the same place. Guardians include friends (going to the park in groups as a form of protection), as well as formal authorities such as private security guards and public police.

Later, Felson (1986) added another potential suppressor. By integrating routine activity theory with control theory (Hirschi, 1969), Felson was able to show that there are people in offender's lives -- parents, relatives, spouses, employers, teachers, and coaches, for example -- who, when present, will prevent the offender from deviating. Felson called these people "handlers." Most adults are away from intimate handlers for many hours of the day and offenders, both juvenile and adult, have few or no intimate handlers (Felson, 1986).

Finally, Eck (1994) suggests that there may be a third class of crime controllers. While guardians act on targets

and handlers act on offenders, the third group acts on places, which came to be called Eck's triplets (see Table 1). The people who manage places -- store clerks, lifeguards, park rangers, airline attendants, and countless others -- also control crime by regulating the behavior of place users. Effective place management either allows offenders and targets to coexist at the same place without crimes, or keeps potential offenders out of places.

Table 1. Depiction of Eck's Triplets

	Eck, 1994		
	Felson, 1986		
	A.	B.	C.
1.Supervision of	Target	Offender	Place
2. Directly Supervised by	Guardian	Handler	Manger

Many studies have taken this concept into consideration. According to Eck and Wartell (1998), managers' in San Diego were ineffective due to a lack of finances, and in turn, were unable or unwilling to regulate behavior of some of their tenants. The findings from this experiment were consistent with recent findings from

similar experiments (Green, 1995, Hope, 1994; Mazerolle et al., 1998).

In the Cook County experiment (Lurigio et al., 1998), a narcotics nuisance abatement unit was put into action using the place managers to find the source of the problem and shut it down. The unit went in and found out who the offenders were, who was the owner of the house, and then decided on a plan of attack. This began with a letter to the owner to apprise them of the situation. According to the 10-building sample that was used, drug house abatement was found to be most effective in stable or slowly declining communities and when the citizens in these areas are willing to participate in the problem.

The Oakland, CA study (Mazerolle et al., 1998a and 1998b), examined the role of place managers in reducing disorder and drug problems, social disorder and signs of incivility. The independent variables for reducing disorder and drug problems, social disorder and signs of incivility that were considered are: place manager activities, cohesiveness, fear of crime, demographic characteristics of the place managers identified on the street blocks in the study, and number of properties on the street. What they found was that the level of place

managers' collective involvement in community activism is associated with decreases in signs of disorder and increases in levels of signs of civil behavior in public places in the street blocks examined.

The variables that Mazerolle et al. (1998b) considered for social disorder were evaluated by observing the condition of the property; routine licit activity (e.g., pedestrians, children playing, people coming in and out of businesses), and illicit activity (e.g., drug dealing, loitering, urinating in public), litter, graffiti, trash, blight, hazards, animal problems, traffic and the presence of law enforcement and security personnel. At the .05 level, they found that four key conditions were significant: males selling drugs, signs of physical disorder, males at pay phones and males at bus stops.

In some instances, the managers create the present problems. The number of undesirables is high within low rent apartments and the landlords are less likely to have regular maintenance done on the structures because the occupants are not likely to complain and bring attention to themselves. Clarke and Bichler-Robertson (1998) found that those living in the low rent apartments were prostitutes, drug dealers, and others with criminal life styles, since

they were not put under strict scrutiny by the rental office as a high monthly rent apartment complex would do.

Site Characteristics

Many studies have used situational crime prevention techniques (see Table 2) to alter the activity in areas that have narcotics hot spots or locations. Several site teams in the Jersey City study (2000) altered opportunities for criminal activity by changing the public telephones to allow outgoing calls only (controlling facilitators) and by installing floodlights in dimly lit parking lots (natural surveillance).

Access control is a Crime Prevention Through Environmental Design (CPTED) concept directed at decreasing crime opportunity. To increase the effort the offender has to spend, apartment building owners could put up fencing around the perimeter of the property (access control) or problem streets in a neighborhood could put up a roadblock (deflecting offenders) to keep traffic out. Reducing the rewards would include cleaning up graffiti immediately (rule setting) or doing rapid repairs quickly (removing inducements). Increasing the risks for offenders would be positioning business employees so that they can observe more of the surroundings (surveillance by employees), or

Table 2. The Twenty-Five Techniques of Situational Prevention

Increasing the Effort	Increasing the Risks	Reducing the Reward	Reduce Provocations	Remove excuses
1. Target hardening	6. Extend guardian-ship	11. Conceal targets	16. Reduce frustration and stress	21. Set rules
2. Control access to facilities	7. Assist natural surveillance	12. Removing targets	17. Avoid disputes	22. Post instruct-ions
3. Screen exits	8. Reduce anonymity	13. Identify property	18. Reduce emotional arousal	23. Alert conscience
4. Deflecting Offenders	9. Utilize place managers	14. Disrupt markets	19. Neutralize peer pressure	24. Assist compliance
5. Control tools and weapons	10. Strengthen formal surveillance	15. Deny benefits	20. Discourage imitation	25. Control drugs and alcohol

Note: Clarke and Homel (1997) then modified by Clarke and Eck (2003).

the presence of security guards (formal surveillance). Surveillance has become a high commodity to be measured lately in narcotics studies.

The origins of Situational Crime Prevention are from Home Office research on institutional treatments. There is a relationship with work on CPTED and "Defensible space" that had been developed contemporaneously in the U.S., and the more recent infusion of concepts from rational choice, routine activity, and other "opportunity" theories.

Situational Crime Prevention aims to reduce opportunities for specific categories of crime by increasing the associated risks and difficulties and reducing the rewards. The twenty-five techniques of Situational Crime Prevention (Table 2) looks at five areas: increasing the effort; increasing the risks; reducing the rewards; reduce provocations; and remove excuses. It follows that high crime places, such as drug markets, can be characterized by low levels of, or the absence of, factors that impose risk, high perceived rewards associated with drug sales and little effort required to sell drugs.

Concentration of Narcotics Activity

Several studies have found a clustering of drug locations within different cities. The methodological approach, variables of interest, and the findings in these study areas were varied as described below (See Appendix A: Drug Market Patterns for a breakdown of studies and findings).

Weisburd and Green (1995) examined the area of Jersey City, New Jersey where they determined that illegal drug market places could be spatially concentrated, and mapped "intersection areas" that were hot spots of illegal drug sales.[1] Fifty-six "hot spots" were identified with drug activity, through computer mapping techniques, which were randomized in statistical blocks to experimental and control blocks. Police arrest data for drug offenses and for crimes assumed to correlate with the location of illegal drug markets were used. It was discovered that while the drug hot spots made up 4.4% of the street sections, it accounted for 46% of the narcotics arrests. These results illustrate the degree to which illegal drug

1 One of three cities involved in the DMA program that sought to develop new strategies for addressing street-level drug problems and to encourage technological innovations in geographic analysis of crime (see National Institute of Justice 1989).

markets are spatially concentrated in Jersey City, New Jersey.

Olligschlaeger (1997) focused his analysis on the drug sales in Pittsburgh where he went beyond the drug markets at the time and predicted where future markets would arise.[2] The early warning system was modified to provide space-time forcasts of changes in 911 calls for service for drugs. The Pittsburgh DMAP system uses a point-based address coverage where the xy coordinates of addresses were determined using the geographic centers of property parcels and were accurately geocoded at 97%. Artificial neural networks were used because it seemed to be able to do more than other statistical methods yet the "how" and "why" of the method is unknown as well as a way to test the statistical significance. While DMAP performed quite well at tracking the geographic displacement of drug dealers via its ability to plot the locations and frequencies of the number of drug calls for service and drug arrests, it did not perform as well at identifying emerging drug markets. The two reasons for this are that drug arrests are hardly made in areas other than those known to be drug areas and

2 One of three cities in the DMA program that involved detail study of the setting of illegal drug markets.

residents are unaware of drug deals occurring before them when it is not commonplace. Therefore there might be a lag time between newly established drug markets.

He used three types of calls for service; weapon-related calls, robbery calls, and assaults-related calls, to help identify possible emerging drug markets in Pittsburgh. Three methods, regression, constant weights, and varying weights were used to test the new data set. The neural network architecture with spatially varying weights more accurately predicted hot spots of drug activity than the other two methods. He was successful in tracking displacement in time and space, identifying new hot spots before street officers were aware of their existence. He also found that the illegal drug markets were concentrated in space.

In Weisburd and Mazerolle's (2000) study of Jersey City, New Jersey they found that 41 percent of the 1,553 intersection areas in the city were linked to narcotics activity. The hot spot sample on average had about 15 narcotics arrests and almost 20 emergency calls for narcotics that were reported at each hot spot.

Types of Drug Markets

There are various types of drug markets. Buerger (1992) and Eck (1994) identify four organizations or types of markets, respectively (see Table 3). The ideas may be similar however; the focus is different which leads to the overlap of ideas to a certain degree.

Buerger (1992) identified four types of organizational strategies: the club, speakeasy, drive-ins, and dealerships. According to Buerger, the club is a close-knit operation where sellers know their customers and it is very difficult to get into unless you know somebody. In the speakeasy operation codes or a catch phrases such as "is anything happening" or "is there any happenings" are used and it is easier to penetrate. The Drive-in type has two variations for different traffic settings and also larger clientele; the "carhop" allows the buyer to drive in to the area, locate an intermediary who will then accept the money, hand it off to the drug carrier, and accept the drugs to give to the buyer; and the "curbside" which is characterized by a drive-thru pattern since the seller is walking the streets and carrying the drugs. Finally the dealership, similar to the drive-in except the intermediary

Table 3. Buerger's (1992) Organizational Strategies of Drug Markets with connection to Eck's (1994) Types of Markets

Type	Operation Type	Access	Transaction Method	Location	Risk	Eck's 4 Types
The Club	"Close-Knit" (they know each other)	Difficult	Person to Person	Street	Lowest	Neighbor-hoods & Closed Regional
Speak-easy	"Pass Word" (deals in codes /catch phrases)	Easier to penetrate	Person to Person	Street	Low	Semi-Open regional
Drive-Ins	The "Carhop" & the "Curbside" (open to the public)	Easy	Drive-up Teller - Go between - Instant	Cars on Street	Medium	Open Regional
Dealer-ship	Similar to Drive-Ins except deal is done indoors	Easy	Behind closed doors	Street / Building	High	Closed Regional

makes the deal with the buyer and then brings the buyer into the house for the final sale.

Eck (1994), however, analyzed drug markets in San Diego, which led him to identify four types of markets based on the concern for security for the buyers and sellers: neighborhood, open regional, semi-open regional, and closed regional markets (see last column in Table 3).[3] These types where based on two variables: 1) whether the customer was local or regional, and 2) whether the location of the drug market attracts customers or whether customers determine the location of the drug market through social network. Eck's 4 types of drug markets include population density as a factor in the equation.

There is not a direct relationship between Buerger and Eck's two market types. Each of Eck's (1994) drug market types is part of more than one of Buerger's (1992) organizational strategies. This overlap is evident in Table 3, where Buerger's "the club" is similar to both of Eck's "Neighborhoods" and "Closed Regional" market types.

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3 The National Institute of Justice (NIJ) funded a Drug Market Analysis (DMA) program to examine five cities. The San Diego project was one of three cities that produced important findings concerning the spatial characteristics of illegal retail drug markets.

Hypotheses

The present research looked to test the past variables identified that where reasoned to be the cause or part of the equation of why narcotics activity was in the particular geographic locations. These variables were examined and tested in a prediction model designed to estimate which areas are prone to be hot spots. Therefore, the hypotheses were created to test the following phases to be conducted.

There are two phases of hypotheses. The first phase tests the prediction model indices and the individual variables that have been identified through prior research. The second phase is divided into two sets. The first set tests whether the repeat locations have higher scores than single incident locations on the social site level. The second set tests the Social Activities Stimulus indices and the individual micro level variables that were collected during the site assessments.

Phase I: Prediction Model Indices

1) Grid areas with a high number on the activity patterns index are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

2) Grid areas with a high number on the crime attractors index are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

3) Grid areas with a high number on the social structure index are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

Phase I: Individual Variables

4) Grid areas with high scores on the housing structure index are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

5) Grid areas with high population are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

6) Grid areas with lower social economic status/income levels are more likely to be in crime hotspots (according to kernel density) than areas with high levels.

7) Grid areas with high scores on the minority index are more likely to be in crime hotspots

(according to kernel density) than areas with low scores.

8) Grid areas with a high number of liquor establishments are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

9) Grid areas with a high number of arterial route connectors are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

10) Grid areas with a high number of payphones are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

11) Grid areas with a high number of vacant units are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

12) Grid areas with a high number of bus stops are more likely to be in crime hotspots (according to kernel density) than areas with low scores.

Phase II: Social Activities Stimulus Index

13) Addresses with high level repeat narcotics CFS are predicted to have higher scores on the social

activities stimulus indices than addresses with low CFS for narcotics activity.

Phase II: Individual Variables

14) Narcotics hot spots are more likely to have high scores on the place attachment index than to have low scores.

15) Narcotics hot spots are more likely to have high scores on the gangs index than to have low scores.

16) Narcotics hot spots are more likely to have high scores on the place management index than to have low scores.

Summary

Prior research has focused on the place managers and their role in the suppression of drug markets. However, there is enough research to prove that environmental factors contribute to the spaces appeal. By identifying factors that promote narcotics activity and putting into place those factors that will inhibit narcotics, those people involved in narcotics activity will either cease use and activity or move to an area that supports their needs.

CHAPTER THREE

METHODOLOGY

Identifying factors conducive to high levels of narcotics activity requires a mixed methodological approach with two different analytic procedures and multiple data sources. The first research phase involves comparing two methods of hotspot identification: computer assisted identification using (a) narcotics calls for service (CFS), and (b) a prediction model based on correlates identified through prior research. In the second research phase areas consistently shown to be hot spots will be subject to intensive study to better understand the phenomenon of drug hotspots. Drawing from prior literature, this study will further test which environmental factors are most highly correlated with narcotics activity.

Study Area: Lexington, Kentucky

Fayette County consists of 283 square miles and a population of 260,512 (49.1% male and 50.9% female) (http://www.fedstats.gov/). A majority of the population is between the ages of 20-54 (57.4%)and consists of 81.0% white (of which 3.3% is Hispanic), 13.5% African American, and 2.5% Asian. About seventy percent of the population

(16 years and over) is in the labor force, and the median family income is $53,264. Approximately 93.2% of the housing units are occupied (leaving 7,879 units vacant) and almost half (44.7%) are renter-occupied.

Adult arrest statistics for drug offenses has been decreasing over the years (see Table 4) (http://www.police.lfucg.com/Planning.asp). Healthy decreases are seen up till 2000 to 2001 with only a 4.96% decrease. The numbers for the adult arrests are enormously higher than those for juvenile arrests. And as can be seen in Table 4, Lexington is half to most of the county totals.

Lexington, Kentucky was chosen as the study location for a number of reasons. First, the geographic data quality is excellent and easily obtained. Also, Lexington is an urban county, so it provides an excellent geographic area with both a city hub and the surrounding area that is self-contained (see Figure 1). Lexington has had narcotics problems that have been steadily decreasing in recent years, even so attention to this type of crime is warranted. The Lexington-Fayette Police Department is

Table 4. Reported Statistics for Lexington, Kentucky

	Arrests					
	# of Adult	# of Juv.	% Change	Total	County Totals	State Totals
1998	1,582	141	---	1,723	1,635	25,560
1999	1,241	112	-21.5	1,353	1,665	28,125
2000	814	96	-32.7	910	1,584	34,082
2001	792	82	-4.96	874	1,474	36,502

Note: Source is the Division of Police, Lexington http://www.police.lfucg.com/.

progressive, open to new ideas and sharing information; thus allowing for an exchange of findings. Finally,

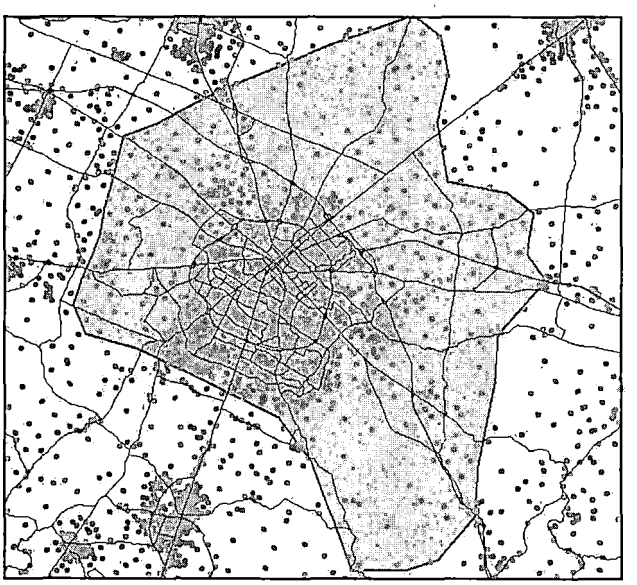


Figure 1. Concentration of Population in Lexington, Kentucky[4]

4 Source: Dots are from Census Population and lines are centroid roads from Lexington GIS.

since the narcotics numbers, minority presence, average household income and area are similar to many cities across the U.S. this made it a prime area for the study.

Phase I: Identifying Narcotics Hot Spots

A kernel density function built into ArcView[5] Geographical Information System (GIS) was used to identify hotspot locations for the crime density based on narcotics calls for service. The prediction model was created and then depending on the variable type, was buffered and converted to grid. The results of both methods were compared to assess the accuracy of the prediction model.

The Prediction Model

Drawing upon the previous research, it is possible to create a model that should predict the locations where narcotics activity will congregate. According to various studies on drug market patterns (see Appendix A), certain environmental factors create the perfect environment for narcotics activity.

Variables. The environmental factors can be organized into three classes: social structure, activity patterns, and crime attractors (see Appendix B). Social

5 ArcView GIS is an Environmental Systems Research Institute (ESRI) product used for mapping.

structure variables were extracted from the census 2000 data at the block level. Activity patterns and crime attractor variables were fashioned from GIS layers received from Lexington (i.e. arterial routes and land use) and other layers were created using phone books and Internet yellow book pages (i.e. liquor establishments, payphones, and activity nodes) to create detailed shapefiles.

Social Structure Variables

Vacant Units. Hope (1994) reported that vacant lots and units provide space for illegal activity without ownership since areas with a high decline in population can also be a prime area for drug activity. Using the Census 2000 data, the proportion of vacant units in relation to all households with census block was used. The proportion of vacant units ranged from 1% to 27% for census blocks (see Table 5).

Population Density. Studies have shown that narcotics hot spots are synonymous with highly populated areas (Lurigio et al., 1998; Weisburd and Mazerolle, 2000). Population density, calculated as the number of people per square mile of land area, was obtained from the 2000 Census at block level. Population density varied widely in this city from 20% to 100% (see Table 5). The areas with the

highest density were located around the downtown area and just on the outskirts of New Circle Rd to the southeast.

Social Economic Status. Areas with lower income levels are prone to drug activity. Lurigio et al., (1998) found this to be true in the Cook County experiment. Weisburd and Mazerolle (2000) found that high concentration of poor people contribute to a drug activity location. Renter occupied from the 2000 Census for block group was used to capture the socio economic status. The number of renters was divided by the total number of households to calculate the total proportion for each census block. Social Economic Status diversely ranged from 3% to 100% (see Table 5).

Minority. Studies have pointed out that in certain narcotics hot spots there is a greater concentration of minorities (Weisburd and Mazerolle, 2000) or a higher percentage of African-American (Hope, 1994). The proportion of African Americans residing in each census block was extracted from Census 2000 data to examine this variable. The black population was ranged from 0.8% to 68.2% (see Table 5).

Table 5 lists the descriptive statistics for the variables within the social structure index. The means

range from 7% (vacant housing) to 45% (social economic status/income). The mean for population density is 0.38, which translates into 3,000 to 4,000 people per square mile. The standard deviations range from 0.05 (vacant housing) to 0.28 (population density).

Table 5. Descriptive Statistics for Social Structure Individual Variables

Variable	Min - Max	Mean	SD
Minority	0.080 - 0.682	0.14	0.16
Population Density	0.000 - 1.000	0.38	0.28
SES/Income	0.000 - 1.000	0.45	0.24
Vacant Housing	0.000 - 0.272	0.07	0.05

Note: All variables consisted of census 2000 data.

The index of social structure was created by an additive procedure. First, using Excel the four variables (minority, population density, SES, and vacant housing) were summed together for the social structure total ranging from 1.185 - 2.212 (see Table 6). The higher the numbers on the social structure index the less social structure present. The total was then converted to a grid of 1320ft (see Table 6) and reclassified to assign a value (0-4) to

each level, respectively. The final output map is shown in Figure 2.

Table 6. Social Structure Index Descriptive Statistics

Level	Equal Interval Breaks Low - High	# grids
Social Structure		
Level 1	0.185 - 0.590	1912
Level 2	0.590 - 0.996	320
Level 3	0.996 - 1.401	281
Level 4	1.401 - 1.807	110
Level 5	1.807 - 2.212	61

Activity Patterns Variables

Arterial Routes. According to Eck (1994 and 1995), drug activity clusters near arterial routes and nodes of high legitimate activities (routine legitimate services; i.e. strip mall with heavy traffic, an outdoor flea market, an indoor mall) and around illicit market places in economically depressed areas. Large markets with numerous people provide greater opportunity and without security two intersecting streets of the arterial roads (based on commuting patterns as identified in city master plan). The

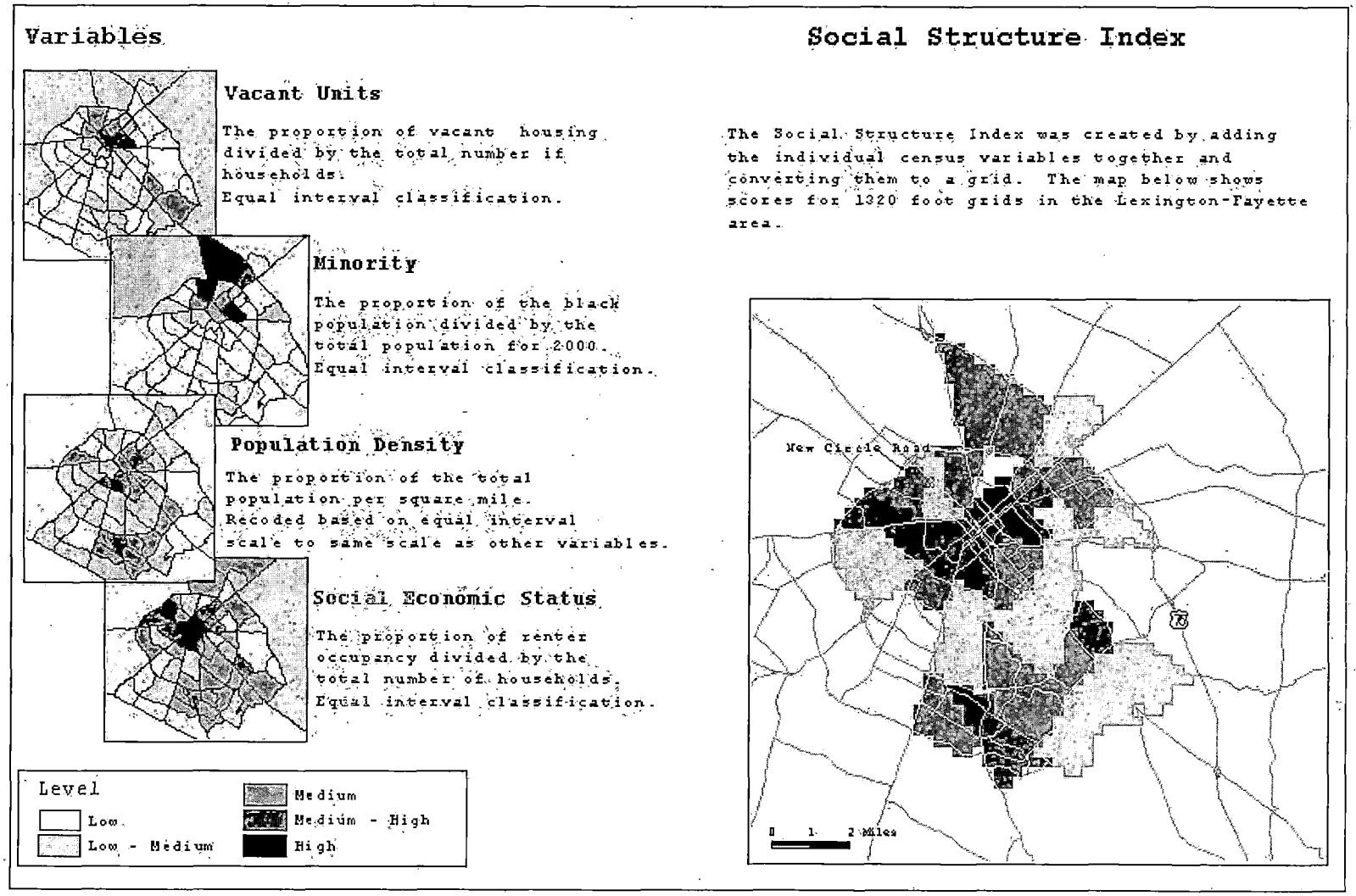


Figure 2. Social Structure Index

selected areas were valued as 1 and all others coded as 0 (see Figure 3). The arterial routes totaled 39.9% of grids (see Table 7).

Bus Stops. Mazerolle et al. (1998) observed many males hanging out at bus stops in the vicinity of drug areas. Also Loukaitou-Sideris (1999) found that bus stops are nodes since six of the ten bus stops observed, were frequently involved in illicit drug sales and activity. Bus stop locations were created using the pick-up/drop-off locations in the LEXTRAN bus schedule. Areas (grids) within 660 feet of a bus stop were assigned a value of 1 and all others are coded as 0 (see Figure 3). The bus stops totaled 0.4% of the grids (see Table 7).

Crime Attractors Variables

Liquor Establishments. Block and Block (1995) studied the CFS and liquor licenses in Chicago for a relationship between them and found that there were a higher number of drug arrests within a one-block radius of a liquor store. In Oakland, California, Green (1995) found that the majority (84%) of the drug sites were located within three blocks of a liquor store or bar. Liquor locations (i.e. bars, convenience stores, and gas stations)

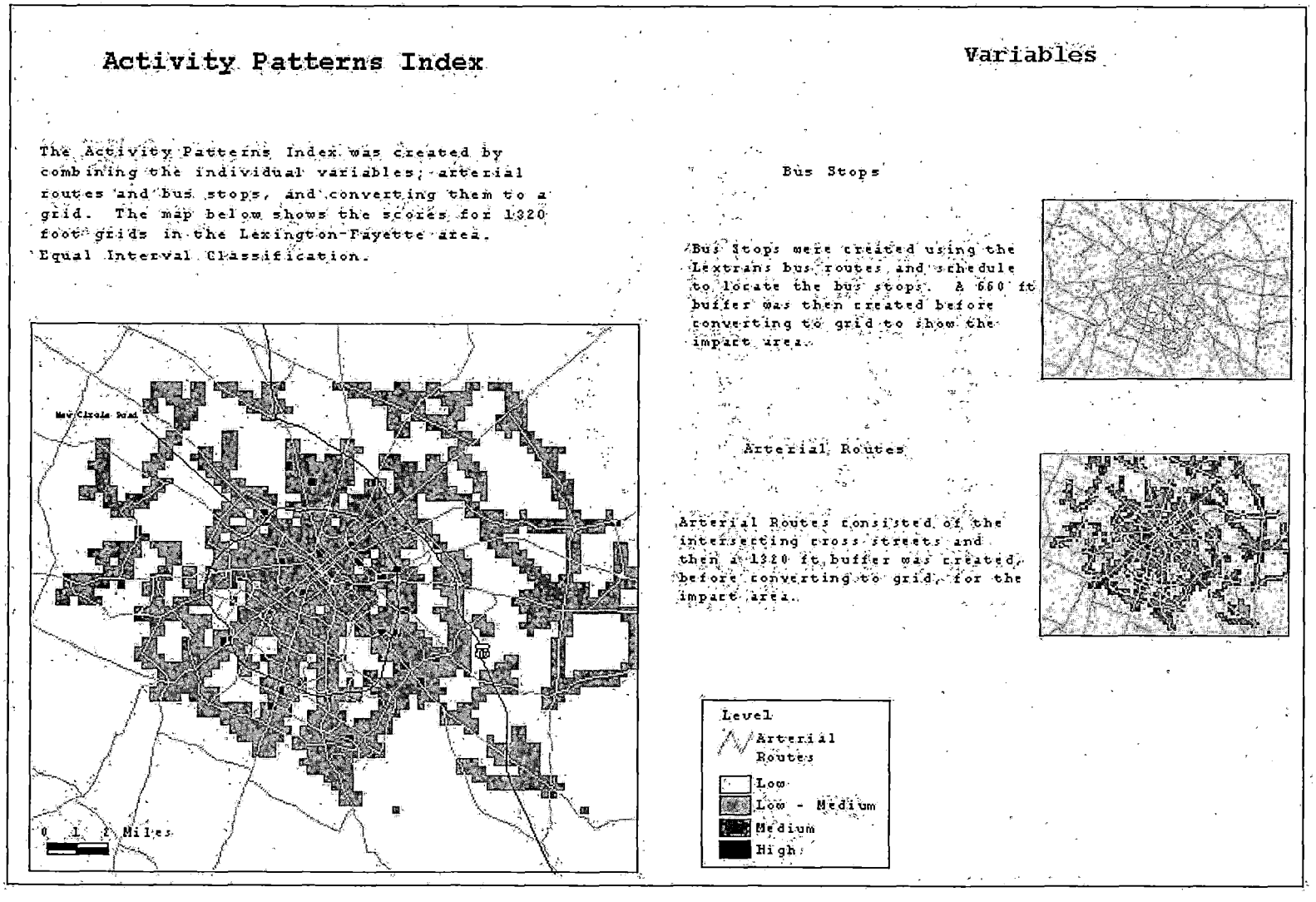


Figure 3. Activity Patterns Index

used in this study were obtained from local phone book and various web site yellow pages to record the address and pertinent information (i.e. hours, accepted form of payment) of these facilities. A one-block buffer (1/8 mile radius) was created around liquor establishments to generate a liquor impact zone.[6] Grids within the buffer were coded as one all others were coded as 0 (see Figure 4). The liquor establishments totaled 0.3% of grids (see Table 7).

Payphones. Mazerolle et al. (1998) noted that there were many males using payphones in narcotics areas. In low-income housing areas, public telephones used in the drug trade have been the target of selective service limitation, removal and relocation (Natarajan et al., 1990 and 1996).[7]

Public phones were identified through a proxy variable; locations of all parks were developed and used to approximate payphone locations. Convenience stores, and gas stations are also common payphone locations but were used within the liquor establishment layer and therefore

6 A one-block (Block and Block, 1995) liquor impact zone was chosen over a three-block (Green, 1995) because of the density of the area.

7 Public telephones are often used to report criminal activity however residents will not report crimes out of fear when the crime occurs close to the public telephone itself (Sorensen, 1998).

were not added to the measurement here for payphones. A 660-foot buffer was created around each location to identify public phone impact areas and then converted to grid. Grids affected by a buffer were coded as 1 and all others were coded as 0 (see Figure 4). The payphones totaled 0.9% of the grids (see Table 7).

Housing Structure. Weisburd and Mazerolle (2000) stated that in their study of drug activity in Jersey City they found that there were fewer single family "owner occupied" so it follows that in hot spot areas for narcotics there will be fewer owner occupied homes (Hope, 1994; Weisburd and Mazerolle, 2000) and more rental units. Further, areas with greater proportion of renter occupancy are likely to have more apartment style dwellings. Also, apartment areas generally have higher rates of transience.

Eck (1995) found that drug incidents were more likely to be in apartments. Locked gates in apartment complexes were associated with drug sales (Hope, 1994). Therefore, housing structure is an important factor. This variable was measured using multi-family areas from land use (1 for

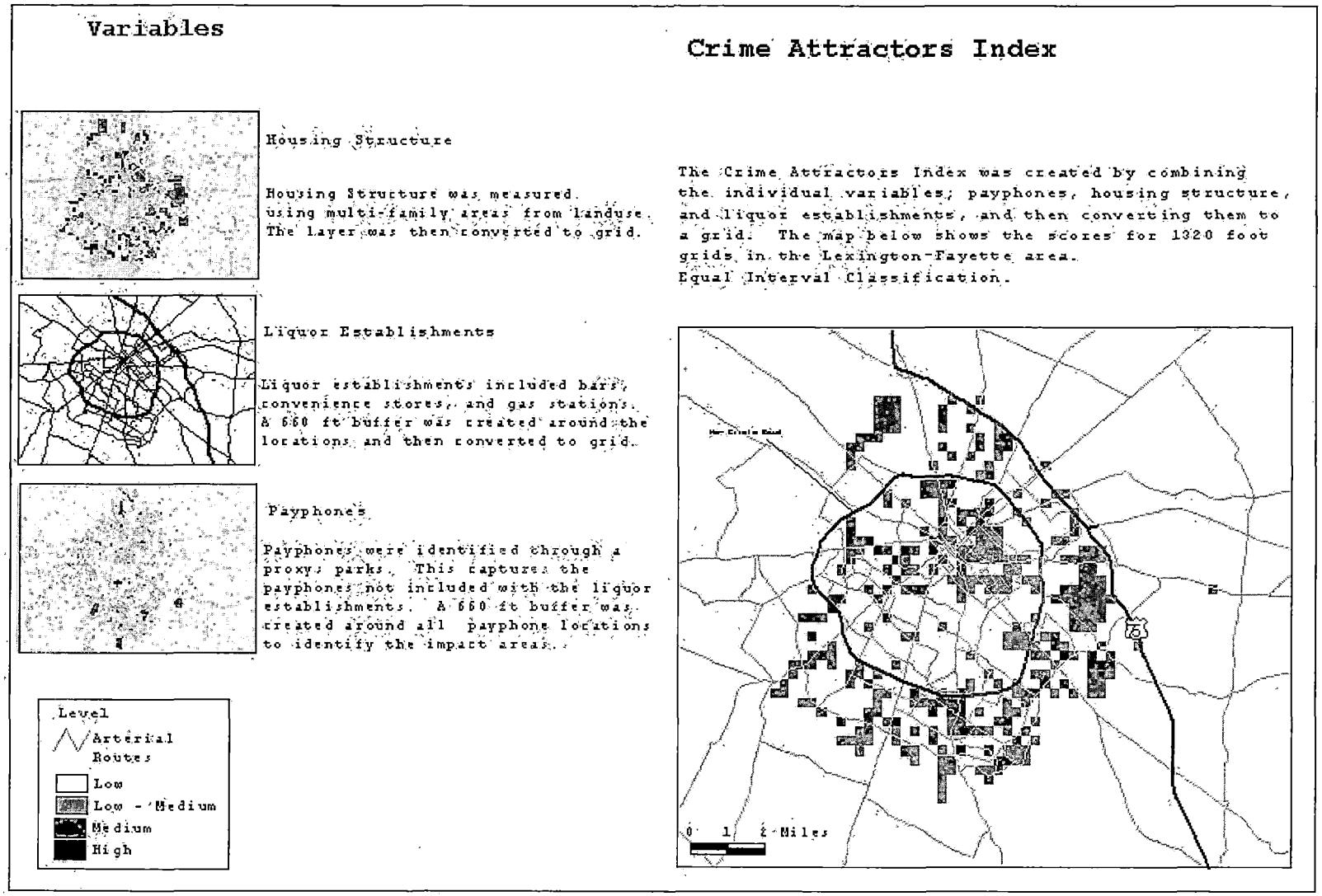


Figure 4. Crime Attractors Index

multi-family and 0 for all others) (see Figure 4). Housing structure totaled 7.0% of the grids (see Table 7).

Table 7. Percentages for Individual Variables

Index/Variables	Percentage of Grid
Activity Patterns	
Arterial Routes	39.9
Bus Stops	0.4
Crime Attractors	
Housing Structure	7.0
Liquor Establishments	0.3
Payphones	0.9

Table 7 lists the percentages for the variables used to measure activity patterns and crime attractors. Arterial routes and Bus stops were summed for the indices Activity Patterns. Housing structure, liquor establishments, and payphones were used to measure the crime attractors indices. High percentages on these measures would indicate a high density of the variable and that it is likely to affect the possibility of a narcotics hot spot. Grids that contained a liquor establishment was 0.3% and 39.9% of grids contained an intersect of the arterial routes.

Collapsing the Variables

These variables were summed to generate an activity pattern and crime attractors' indices (as shown in Table 8). Table 8 shows the ranges of measurement for each of the indices and the means that range from 0.090 to 0.540.

Table 8. Descriptive Statistics for Indices

Index	Min	Max	Mean	SD
Activity Patterns	0.00	2.00	0.407	0.502
Crime Attractors	0.00	3.00	0.090	0.355
Social Structure	0.00	4.00	0.540	0.341

Note: Count (n) = 2684.0

Cells with higher scores on each index, increases the attraction for drug activity. Cells with highest scores are predicted to be narcotics hot spots (see Figure 5). The results of these problematic narcotics areas that are identified by means of a prediction model were compared to a density analysis of the CFS.

Identifying Actual Crime Hot Spots

The Lexington-Fayette Police Department supplied the calls for service for the years of 2000-2001. The calls

for service used, included both citizen and officer initiated calls. After extensive cleaning and integration of files from the different Record Management Systems (RMS) (2000 Roark and 2001 NWS), the calls for service were

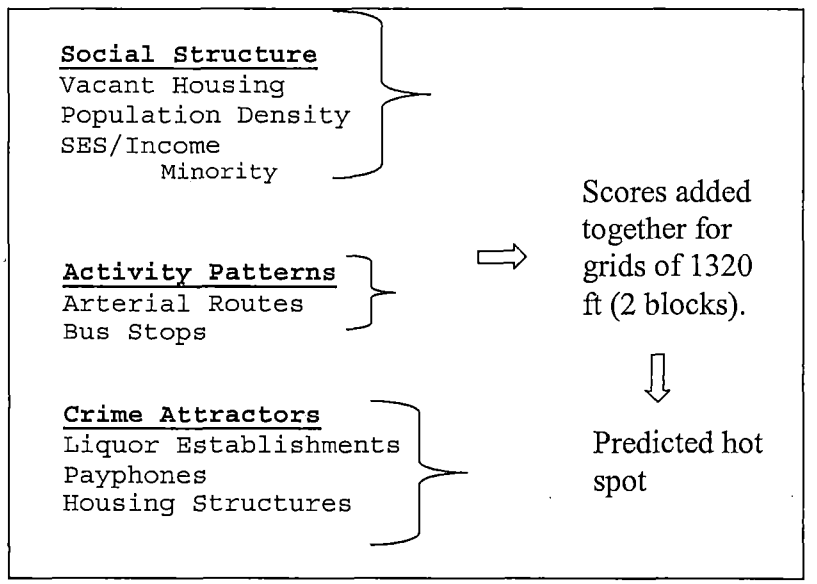


Figure 5. Process of Prediction Model

mapped. As expected, the address for the police department (150 Main) was cut from the sample so as not to misconstrue the identification of hot spot areas.[8]

The hot spots were identified through kernel density analysis, using ArcView. Kernel density is the concentration or clustering of any type of location (i.e.

8 The police department entered in their address for numerous reports because that is where the report was taken. Therefore, using that address would not give an accurate portrayal of the narcotics crime in Lexington.

bars, parks, apartments) in graduated color. The deeper the color of an area the more dense the clustering of the locations is.

Each cell in a grid has a circular search area attached to it. A kernel density calculation weights the points lying near the center of a grid cell's search area more heavily than those near the edge. The search radius used was two blocks (1320 feet). As was estimated, the density generated about 25 hot spots in the Lexington area. These hot spots were then compared to areas identified by the prediction model as having a concentration of factors conducive to narcotics activity.

Geocoding preferences were set at 80/80/80 for the CFS addresses (as well as all other address based geocoding). This means that for each of the minimum score, spelling sensitivity, and candidate match score of the geocoding preference settings to be matched a suitable location had to be 80% similar to the address of the crime event location on all three factors in order to plot. An address has to match the directional prefix, street name, street type and be within the segment range to be a suitable match. Each section of the address is worth a certain number of points, so if the street type is missing or

incorrect then points will be deducted from 100. Therefore, few differences between the street file and the crime data are possible to still be a match at 80. As suggested by Bichler et al. (2004), geocoding above 80 does not ensure higher accuracy of addresses.

Analysis: Phase I

The analysis of phase I, aims to determine whether there is a positive direct relationship between the predicted hotspots and the actual hotspots (CFS density). The two methods were compared using a contingency table (see Figure 6) to measure the reliability of the prediction model.

Map calculator, a function of ArcView, was used to add the grids of the variables of each indices and then summed the indices included in the prediction model. The CFS density was converted to grid (raster format) as the prediction model indices had been. These two maps were then layered to show the overlap between the two methods.[9] The contingency table (Figure 6) shows the relationship between the two methods densities. The correlation between the two

9 Z scores were attempted but did not add notable significance to the process.

methods will be positive if all density areas are the same (designated by the patterned dark gray).

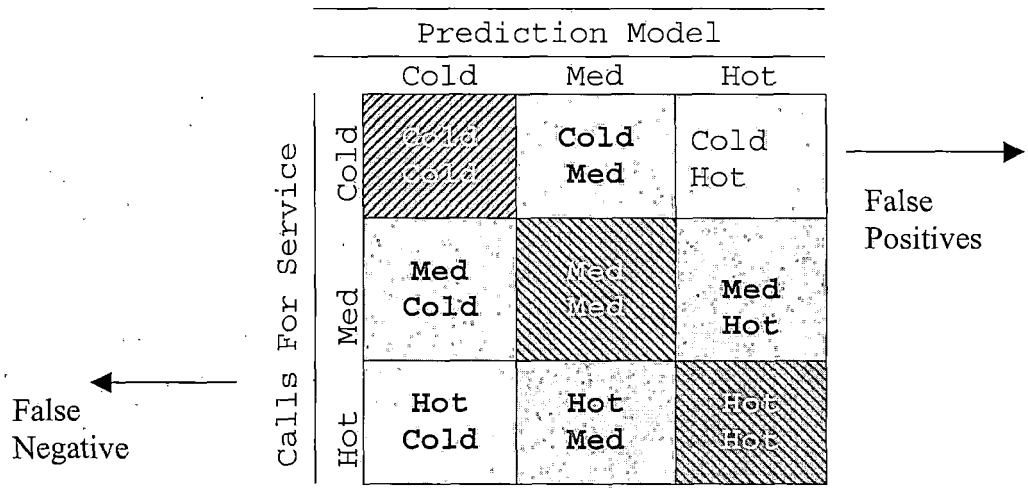


Figure 6. Relationship Table

Phase II: Location Assessments of Calls For Service

Hotspots identified through the kernel density analysis from CFS data (2000-2001) were examined in more detail during phase II. As mentioned before the CFS data included both citizen (93%, N = 534) and officer (7%, N = 40) initiated calls, Table 9 shows some of the different types of calls in the sample. The type of CFS used was general narcotics calls and so included calls on both narcotics sales and using.

The hot spots were dissected to get the addresses contained within each hot spot. These addresses then underwent an environmental assessment. Again based on

Table 9. Breakdown of Calls For Service Sample

Type	Citizen Initiated		Officer Initiated		Total	
Arrests	73	(13.7%)	21	(52.7%)	94	(16.4%)
Gone / Arrival	103	(19.3%)	3	(7.5%)	106	(18.5%)
Report Made	30	(5.6%)	8	(20.0%)	38	(6.6%)
Unfounded	42	(7.9%)	1	(2.3%)	43	(7.5%)
Complaint Investigated	130	(24.3%)	2	(5.0%)	132	(23.0%)
Assitance Given	32	(6.0%)	2	(0.3%)	34	(5.9%)
Other	124	(23.2%)	3	(12.2%)	127	(22.1%)

Note: Total N = 574

prior research recognizable behavior was identified and three indexes (Social Activities Stimulus) were created for measurement. The instrument gathered information for measurement during site visits, and an analysis was performed to identify important factors of the social environment.

Site visits were used to gather environmental data through a formal observation instrument and photos. Routes

were planned out for a three day trip so that all locations could be visited during the day and evening. A one-page site assessment form was filled out for every location (see Appendix C). Day evaluations included the social disorder that was present as well as any sign of drug dealing at the time and additionally ranked the levels of lighting available for the sites. A scale was used to determine the amount of light in the area.

The micro-level (Social Activities Stimulus) indexes to be observed are: place attachment (amount of ownership); visibility of gangs; and place managers. Other information to be collected at the scene includes the type of building (apartment, trailer, duplex, house, etc.

Social Activities Stimulus Index

Place Attachment. Eck (1994) found that place attachment was high for the drug hot spot areas. Place attachment is related to the level of comfort that one feels in a particular area or place (Brantingham and Brantingham, 1998). There could be a sense of place ownership from regularity of use. Two indicators were used for this variable; the number of people who lounge around the area, and the furniture in the front yard or personal

space. Each indicator was coded with a value of 1 if true and all others with a 0.

Gangs. Lurigio et al. (1998) found that gangs were a high factor in narcotics areas; the presence of graffiti and youths wearing gang colors. They have a sense of ownership for the area; they contribute to the deterioration of the area by marking it as their own (graffiti) or in littering and destruction of property. Skogan (1990) noted that in Philadelphia there are corner gangs that range from casual groupings engaging in a bit of drinking and social conversation to organized fighting squads. Indicators for this variable include: casual groups hanging out on the street or by buildings, partaking in drinking alcohol, and visible signs and colors. Each indicator was coded with a 1 if true, all others were coded with a 0.

Place Management. Place managers at a location provide surveillance and ownership to the building that will help prevent illicit drug activity (Eck, 1994; Eck and Wartell, 1998; Mazerolle et al., 1998) including apartments. Low surveillance was typical of the hot spot areas in Chicago (Block and Block, 1995). Lighting levels in an area will relate to possible surveillance of

neighbors and visibility of drug sales or activity (people walking the streets, on the phone, walking up to cars and then the car driving off, etc.). This indicator was coded with a 0 for poor, 1 for average, and 2 for good.

Deterioration of buildings was a noticeable factor in areas of drug activity (Hope, 1994). Presence of trash (Skogan, 1990), broken windows (Wilson and Kelling, 1982), and graffiti (Lurigio et al., 1998) are signs of poorly maintained buildings. Unclaimed and impersonal space is the favored target of graffiti artists (Ley and Cybriwsky, 1974) also, a place that has been hit with graffiti once will more than likely be hit again (Skogan, 1990). The activity in an area changed by removing blight and abandoned vehicles (Green, 1995).

Place Management was measured by the following indicators; the presence of abandoned vehicles, graffiti, trash, and broken windows, with each being coded as 1 (representing low management) if present and a 0 (high management) if not present. The level of lighting was added for a total place management score. The type of building was also collected for comparison.

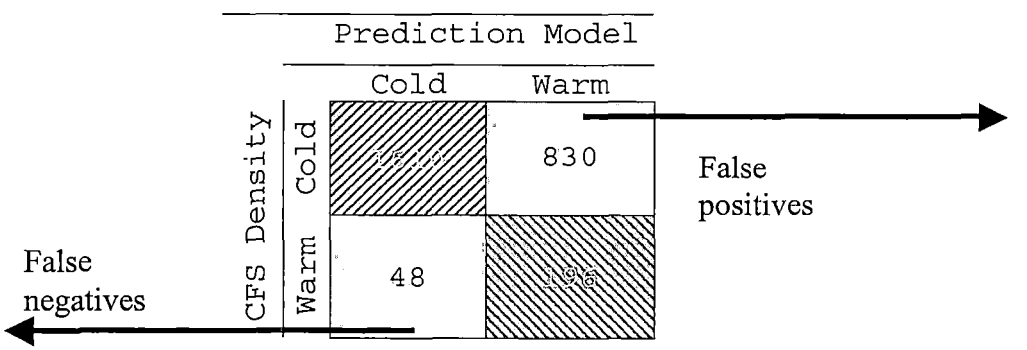
CHAPTER FOUR

RESULTS

Phase I: Prediction Model

The prediction model indexes and the individual variable results were discussed earlier (Chapter 3) and no significance was found. However, there are some interesting and noteworthy results that were found within the prediction model itself.

The initial results of the table showed three cells with zero grid scores. The contingency table, as a result, was collapsed to include cold and warm areas only. The completed table is shown below (Figure 7).



Note: df=1, χ^2=1.7, ϕ=0.03, sig. 3.841.

Figure 7. Completed Relationship Table

A chi-square (χ^2) suggests a relationship between CFS density and the Prediction Model. The Chi-square was found to be 1.7 with a Phi (ϕ) coefficient of 0.03. The Phi indicates no relationship, being just slightly over 0.00, a stronger relationship would have been close to 1.00.

The prediction model did accurately predict 97% (N=1610) of the cold narcotics grids and 19% (N=196) of the warm/hot narcotics grids. Overall the model is 67% (N=1806) accurate in predicting narcotics locations.

Phase II: Repeat Versus Single Incidents and Micro Level Data

As discussed in Chapter 3, the analysis for phase II included a comparison of the repeat call locations versus the single call locations for addresses located within hot spots identified by the kernel density. There were four hypotheses that were tested including a bivariate and a multivariate. The variables were compared based on the scores using an Analysis of Variance (ANOVA), specifically an F test and Eta (correlation). The multivariate analysis involved a logistic regression to predict repeat narcotics addresses.

Figure 8 shows the repeat and the single incident locations. These locations were used for the micro-level data collection. There were 76 repeat locations and 52 locations with single calls for service (CFS) during the 2-year study period (total N=128).

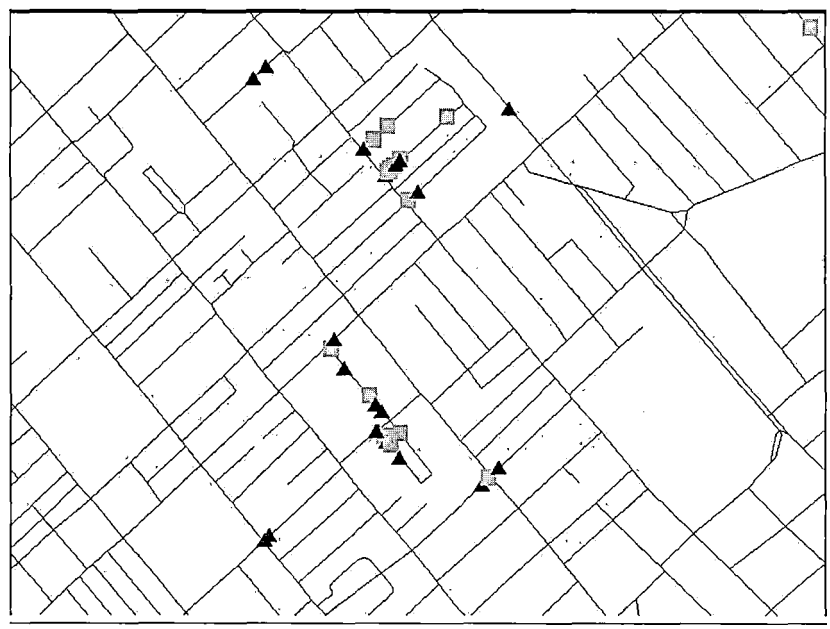


Figure 8. Repeat Versus Single Calls For Service

A one-way ANOVA (Table 10) was used to test the three hypotheses that refer to the Social Activities (micro-level) indexes. The eta^2 shows that there is a 1% variance in the repeat or single offense locations explaining place attachment. These low levels of variance and little to no relationship between the narcotics hot spots and the social

activities stimulus says that the concepts being measured are not the driving force for narcotics activity.

Table 10. Analysis of Variance Computations for Micro-Level (Social Activities Stimulus) Index

Index	Mean	s	Sig.	F	Eta^2
Place Attachment					
Single	1.06	0.78	0.252	1.325	0.010
Repeat	0.89	0.79			
Gangs					
Single	0.38	0.69	0.642	0.219	0.002
Repeat	0.33	0.64			
Place Management					
Single	1.14	0.75	0.245	1.366	0.011
Repeat	1.32	0.93			

Note: Total (N)=128, Single (N)=52, Repeat (N)=76, df=1.

Finally, a logistic regression was used to assess the multivariate model for predicting high level repeats. A logistic regression was performed to predict the probability of the social activities stimulus indexes (place attachment, gangs, and place management) in relation to repeat and single narcotics CFS. As can be seen in Table 11 there was no significance (p) with any of the indexes. The Wald x^2 test and odds ratio shown in Table 11 employs a 0.05 criterion for statistical significance, of which there is none. The odds ratio states that the place attachment, gangs, and place management indexes are more

likely to be present 1.142, 1.152, and 1.340 (respectively) of the time in a narcotics activity area. Since the N was low it is possible that with a bigger sample, place management might have shown some significance. Higher odds ratio numbers would have indicated a correlation between narcotics activity and the indices tested.

Table 11. Logistic Regression of Social Activities Stimulus Index

Index	β	Wald x^2	p	Odds Ratio
Place Attachment	0.762	1.233	0.267	1.142
Gangs	0.944	0.040	0.841	1.152
Place Management	1.315	1.541	0.215	1.340

Note: df=1, N=128, R^2=0.023.

Since the Social Activities Stimulus Index was not significantly related to repeat locations, a closer look at the individual measurements of the variables might reveal important patterns. Table 12 shows that although most relationships were not significant many of the relationships were in the hypothesized direction. A larger sample might have resulted in more measurements, and in turn the variables, with significance.

Table 12. Crosstabs for Micro-Level (Social Activities Stimulus) Individual Variables

Narcotics CFS					Place Attachment
	People				
	No	Yes	X^2	Sig	Phi
Single	35.6	44.9	1.149	.186	-.095
Repeat	64.4	55.1			
	Furniture				
Single	37.8	44.4	.565	.284	-.066
Repeat	62.2	55.6			
					Visibility of Gangs
	Groups				
Single	39.2	45.2	.349	.350	-.052
Repeat	60.8	54.8			
	Alcohol				
Single	40.4	42.9	.032	.537	-.016
Repeat	59.6	57.1			
	Signs				
Single	40.6	0.0	.	.	.
Repeat	59.4	0.0			
					Place Management
	Abandoned Vehicles				
Single	40.9	0.0	.690	.594	.073
Repeat	59.1	100.0			
	Graffiti				
Single	41.3	0.0	1.390	.351	.104
Repeat	58.7	100.0			
	Trash				
Single	42.7	37.0	.401	.329	.056
Repeat	57.3	63.0			
	Broken Windows				

Single	41.7	36.0	.276	.386	.046
Repeat	58.3	64.0			
	Lighting				
	Poor	Average	Good	X^2	Sig	Lambda
Single	33.3	47.3	31.3	3.247	.197	.000
Repeat	66.7	52.7	68.8			
	Building				
	Apt	House	Other			
Single	45.8	54.2	20.0	12.946	.012	.445
Repeat	54.2	45.8	80.0			

Note: Numbers shown are percentages except for X^2, Sig., and Phi. Total (N)=128, Single (N)=52, Repeat (N)=76, df=1. For the individual variables the Min = 0 and the Max = 1, Lighting and Building had Max= 2 and 5, respectively.

The measurements for place attachment and place management were going in the hypothesized direction. For place attachment there were not as many people hanging around or furniture in the front yard to suggest that people would be present to observe the neighborhood. Repeat locations were more likely not to have people hanging around in the front yard. With a larger sample this may have shown significance (sig. = 0.186), however the relationship is apparent.

The measurements for place management support the directional theory since abandoned vehicles, graffiti, trash, and broken windows have higher numbers in repeat locations. Therefore in repeat locations more opportunity

is available for narcotics activity. Expectations for lighting also were close to being significant. Single locations were more likely to have average lighting while repeat locations had poor or good lighting.

The only significant finding was building type (sig. = 0.012) with a chi-square of 12.946, and a strong relationship (Lambda = 0.445). The repeat locations showed a relationship within the building type, other, more likely to be public locations than private (i.e. garages, businesses, parking lots, etc.). Single locations had more houses as building type than repeat locations.

The measurements for visibility of gangs did not have numbers going in the right direction to suggest that this was important to narcotics activity. All measurements were high for not being a factor to repeat locations. There is a possibility that the measures used are not applicable to Lexington, KY. Gangs may not express themselves in the same way that they do in Los Angeles, CA; for example with the gang colors, signs, and graffiti to mark their territory.

Originally the site instruments included a night survey as well as the day. Due to time constraints, it was not possible to obtain night details on the locations,

which turned out to be a limitation. Night surveys might have revealed more narcotics activity that would have resulted in finding with significance. A future study should allow for night surveys to get the whole picture of the environment.

In Chapter 5, the prediction model is discussed in great detail. This includes reasoning for the relation ship table findings and other interesting factors found within the model. Also a closer look at the repeat versus single incidents and the individual measurements of the Social Activities Stimulus Indices used in Phase 2 are examined.

CHAPTER FIVE

DISCUSSION

Phase I: Prediction Model

The problem lies in the false positives (N=830), where the predicted spots are actually cold or not conducive to narcotics activity. There does seem to be a possible problem with the census data level. Since the data is not in smaller units and is in census blocks, the data is to general and therefore may have skewed the model (placing more false positives in the mix). Therefore, the prediction model was run a second time eliminating the variables that used census data (minority, population density, and vacant housing) in Figure 9.

By not including the census data, the 830 false positives were reduced by moving more grids into the cold areas. Now the cold predictions are 99% (N=1841) accurate. The warm predictions were lessoned drastically by half to 10% (N=65) accuracy for narcotics locations. Also the total accuracy rose to 76% (N=1906). However, the reduction in the number of accurate warm grids leads to the conclusion that the census data was helpful in predicting narcotics hotspots even though it added false positives.

The ratio of missing warm prediction is greater than the missing false positives; and therefore, the census data should be left in the model.

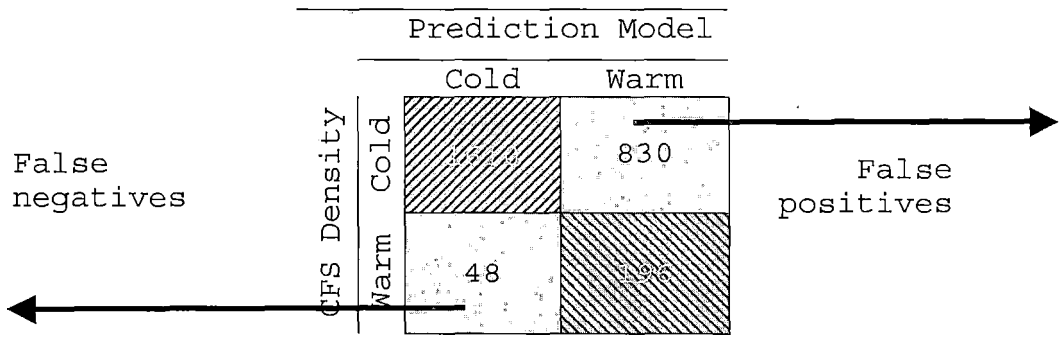


Figure 9. Relationship Table without Census Data

The Donut Effect

In Figure 10 the medium gray represents the predicted hot locations (the light gray is the predicted cold crime grids) and the contour shape is the actual crime. There appears to be a donut effect, where the actual crime hot spots are surrounded by the predicted hot spots (Table 13).

As can be seen in Figure 10, the narcotics hotspots are adjacent to (almost halfway surrounded by) predicted hot grids. This implies that the surrounding area has all of the indicators for a narcotics hotspot even though the

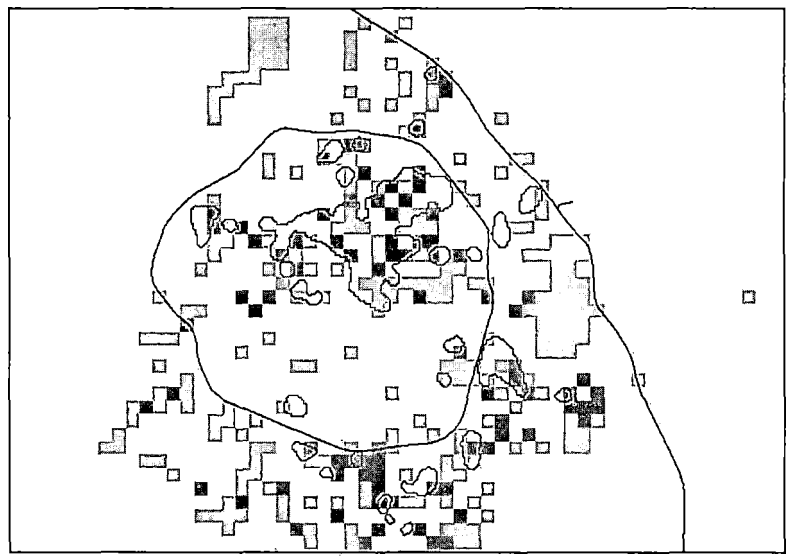


Figure 10. Donut Effect[10]

actual crime was located outside the predicted hot grids. The model may predict neighborhoods with social conditions that narcotics activity supports. This idea is analogous to an impact zone or catchments area, in that the predicted areas are impacting the actual narcotics hotspot because of its surrounding.

Displacement of crime problems is an issue that challenges the effectiveness and value of place-oriented police interventions. Displacement is generally defined as the extent to which the blocking of opportunities will cause problems to be displaced to nearby places (spatial

10 Note: Dark grey color is the predicted hotspots and the contour shapes are the actual narcotics hotspots. The buffer is approximately a 1-grid cell size radius of the actual narcotics hotspot.

Table 13. Number of Predicted Hot Spots Surrounding an Actual Narcotics Hot Spot

Hot Spots	Number Hot	Number Cold	Donut
1	7	1	1
2	9	1	1
3	4	4	0
4	6	2	1
5	6	2	1
6	6	2	1
7	4	4	0
8	8	3	1
9	5	3	1
10	11	5	1
11	2	6	0
12	7	1	1
13	4	4	0
14	9	1	1
15	6	2	1
16	5	4	1
17	29	8	1
18	24	6	1
19	6	2	1
20	11	4	1
21	14	3	1
22	6	2	1
23	7	4	1
24	4	4	0
25	4	4	0

Note: In the Donut column 1 = yes and 0 = no.

displacement), to be committed in another way (tactical displacement), or to be transformed into some other kind of offense (target displacement) (Gabor 1978; Reppetto 1976). These negative effects occur when crime prevention measures block opportunities at some places or in some situations,

but fail to protect other nearby places or situations from offenders who are either not discouraged or not deterred from committing a crime.

There are many possibilities why there were 830 false positives. Past or present displacement could answer the question of the false positives. The predicted locations could be where the hot spot was prior to the 2000-2001 CFS and with police pressure the narcotics hot spots moved just outside the previous locations. It is also possible that the false positives identify areas closely affiliated with narcotics crime or are up incoming hot spots.

The donut effect occurs on many occasions as shown in Table 13 (hot spots column). For purposes of this study the donut effect is considered to be true if more than half of the surrounding grids, of the actual crime grid, are hot prediction grids. Totaled, the number of donuts is 76% (hotspots = 19). This suggests that most actual narcotics hotspots are surrounded by predicted hotspots and therefore the model is better than first thought.

Phase I: Hypothesis Discussion

The first phase tested the prediction model indices and the individual variables that had been identified through prior research (see page 27). The activity

patterns hypothesis was not supported. When looking at the individual variables used to measure the indices it is possible to understanding the final findings. According to prior research, arterial routes (Eck, 1994 and 1995; Weisburd et al., 1995 and 2000) and bus stops (Loukaitou-Sideris, 1999; Mazerolle et al., 1998) were found to be important in narcotics activity. However, the data used in prior research included police information (Eck, 1994 and 1995; Weisburd et al., 1995 and 2000) in addition to CFS or the focus of the study was on apartment complexes rather than the city as a whole (Loukaitou-Sideris, 1999; Mazerolle et al., 1998) and thus may account for the different findings.

Crime attractors were not found to be indicators of narcotics activity in Lexington, KY. Liquor establishments (Block and Block, 1995; Green, 1995), payphones (Eck, 1994; Mazerolle et al., 1998 and 2000), and housing structures (Eck, 1994; Hope, 1994; Weisburd and Mazerolle, 2000) were found in prior studies to be indicators of narcotics yet that did not hold true in the present study.

It is possible that larger impact buffer, a 3-block radius (Green, 1995) instead of the 1-block (Block and Block, 1995), should have been used. Also, payphones may

not be an indicator of narcotics activity anymore with the always-improving technology and the surplus of cell phones. Future aspirations would find another method of tracking contact; possibly focusing more on the type of market would offer other possible measures.

The social structure hypothesis, consisting of census 2000 data, was not supported, however it was noticeably important to the relationship table (as discussed earlier). The variables gave little individual importance as suggested in previous studies. Vacant housing (Hope, 1994), social economic status (Eck, 1994; Lurigio et al., 1998; Weisburd and Mazerolle, 2000), population density (H10) and minority (Hope, 1994; Lurigio et al., 1998; Weisburd and Mazerolle, 2000) were not found individually important.

It is possible that the census data is not a good data resource to use in a grid compilation. Other sources may have resulted in better findings, however was unavailable at the time of this study. Obtaining a list of all section 8 housing in the area of study might offer a better measurement than using census data.

Therefore, the three research hypotheses (shown below), where not supported. Further examination of the

individual aspects of each index did not result in any significant findings. As a result, it is possible that the variables are either not useful indicators of narcotics activity (suggested by prior research) in general across a city, or these variables are not indicators in this study area. Lexington may have a very different type of drug market than first thought.

Phase I: Implications

There are many implications that could benefit the crime analyst at a police department or a researcher looking at predicting crime. First, the indicators for narcotics activity may not be universal and therefore what happens in one area may not be true of another. There may be other influences that either cannot be measured or have not been found.

Another aspect that could be looked at would be the movement of the hot spots over time. A major influence of the movement is the criminal behavior other than narcotics sales. It has been noted that those going to purchase narcotics are likely to commit other criminal acts to support the narcotics habit. Therefore it is not uncommon to find an offender en-route to the narcotics area, who burgled a home in order to pay for their habit. Once the

area is no longer profitable and able to support the habit due to higher patrol or owners not replacing the stolen items, the offender will move on to another area.

The issue of displacement has been discussed but needs to be considered when planning strategies to prevent or control narcotics activity. Spatial Displacement occurs when offenders move away from areas in which narcotics activity has become more difficult, and begins to sell narcotics in another area. However, it is also possible that the offender may switch the type of drug market they were involved in (drive-in to speak-easy) in order to protect themselves.

Even though the prediction model did not accurately predict the hot spots, it did accurately predict the cold spots (97%) and therefore eliminates most of the land area for strategists to cover. There are always going to be new developing markets and finding them in the early stages so that the area does not become a huge nuisance is imperative.

Finally, it may be possible in the future to do a larger study that looks at multi-cities to gather indicators of narcotics activity. This would allow for more diversity among the indicators and a truer

understanding of which indicators are more prevalent in different types of area. This would result in the creation of a more comprehensive checklist for crime analysts, which could be used universally across the map.

Phase II: Repeat Versus Single Incidents and Micro Level Data

There are a couple reasons that might explain why there were few significant findings. The first reason is that the single incident CFS was not actually a single but could have been a repeat. CFS relies on the community calling in reports of misconduct or problems (93% of CFS). If the single incident calls made were not the initial occurrence but on the second or third occurrence then it would actually be a repeat (however unknown to us). If an officer initiated the call, it is possible that the area was known for its narcotics activity and probably not the first offense. Therefore, it might have been better to compare CFS to no crime areas rather than single to repeat occurrences.

The second possible reason was a lack of true variance in the sample selected. The sites that were chosen may not have incorporated enough diversity to include all of the different areas. It is possible that the areas visited

were too similar and therefore were not able to be compared. Or the level at which the analysis was examined was too involved in the activity. Since the site instrument was designed for and taken at street level, it is possible that the researcher had an affect on the environment, as the Hawthorne effect suggests. Those selling drugs have a sense of who belongs in the area and who does not. Just being present, the researchers may have altered the activities in the area.

Also the instrument did not take into consideration the different types of drug markets (i.e. drive-in, the club, speakeasy, and the dealership). Therefore, possibly taking a step back and examining in terms of streets or blocks would result in better findings.

Phase II: Hypotheses Discussion

The second phase tested whether the repeat locations have higher scores on the social activities stimulus indices and individual variables than single incident locations (see page 28 for hypotheses). Place attachment (Eck, 1994), visibility of gangs (Lurigio et al., 1998), and place management (Block and Block, 1995; Eck, 1994; Eck and Wartell, 1998; Green, 1995; Hope, 1994; Lurigio et al., 1998; Mazerolle et al., 1998) were reported

to have been indicators of narcotics activity in past studies, yet was not shown to be significant in this study. It is possible that with a larger sample size some significance would have materialized.

As explained there was no significance in the social activities stimulus indices or among the individual variables and therefore all of the hypotheses tested for were null.

Phase II: Implications

An implication of this phase includes the level of analysis that may be too close or within the study area, taking a step back and looking at a bigger unit of analysis may be more beneficial. Rather than looking at individual narcotics locations, examine the street, block, or hot spot for continued narcotics growth. However the comparison should be an area that is void of narcotics activity.

In addition, if the study was dynamic it could have had a time dimension that showed the change in time, from year to year. As mentioned before, showing the changes over time may help to forecast where the future hot spots might be, especially in relation to other crime types. For example, looking at the percent change in minority over

time would show a movement pattern that might help to identify other coinciding changes in the area.

In the future, further examination of the crime and the indicators would generate stronger conclusions. Since the data was static there is not a representation of time. Had there been more preceding data that went back 10 years to compare to the present, then change could have been a factor. With more data it would have been possible to account for changes in the community; structurally (physically), economically and socially.

CHAPTER SIX

CONCLUSION

Narcotics activity has been a problem for numerous years and the purpose of this study was to test a model that could be used to predict the hot spot areas so that preventative measures could be taken. Then a closer examination of the repeat versus the single incidents (from the CFS) was employed focusing on differences in the micro-level data collected. Both of these endeavors were unsuccessful in respect to significance however interesting in what that means for future studies.

The first phase, the prediction model did not succeed in identifying the narcotics hot spots for the Lexington, KY area. The predicting indicators of narcotics, based on prior research, either was not true of the Lexington, KY area or not actual indicators of narcotics activity. However, the model was successful in predicting cold areas that by process of elimination will leave the hotspots or at least areas that preventative measures could be installed.

Many researchers have discovered indicators while examining narcotics activity. As was discussed in Chapter

3, through the collapsing of studies the prediction model for this study was created. Now upon looking at the results, indicators of past narcotics activity was not able to predict actual crime locations.

The donut effect accounts for most of the hot spot relationship between the predicted areas to the actual crime. The problem with this is still the false positives, which do not surround actual narcotics activity. This might be explained away by the possibility that those are future narcotics activity hotspots that have yet to sprout or past hotspots that have since moved on. A better exploration of this would be to do a patterned change over time with time sensitive data that could better follow the hotspots and the predicted hotspots over a 10-year span.

The second phase was a comparison of repeat and single narcotic incident locations. The locations were examined for environmental factors that should have created a narcotics friendly area. Repeat locations were expected to have higher levels of the environmental factors than the single incident locations, which was not the case. The social activities stimulus indices reported no significance even with the individual variables. Possible future

research should involve a larger sample and include night surveys for the whole picture.

Narcotics activity will continue to be a problem until what feeds the market is established. The prediction model attempted to establish the indicators of narcotics activity, yet only established to areas where narcotics activity was not located. Examining repeat versus single narcotics CFS led us to believe that the CFS are not single and that a better comparison would be locations with no reported crime. It is possible that the main objective, creating a checklist for narcotics activity, can still be accomplished and this research brings that steps closer.

APPENDIX A

RESEARCH PATTERNS CHART

Drug Market Patterns Chart

Reference	Data Source	Area Hot Spots	# Drug Markets	Theory	Characteristics
Eck (1994) San Diego	- Calls for Service - Arrest Records - Patrol Information			Routine Activities Theory (R.A.)	- high place attachment - place managers - arterial routes & near nodes of high legitimate activities - large markets with numerous people
Eck (1995)	- police records - patrol / police declared problem areas	- five beats examined	303 addresses with 2 or more instances (132 census blocks)	R.A. & Situational Factors	- clustered along arterial routes or around nodes of routine legitimate services - the arterials and nodes with illicit market places clustered around them should be in economically depressed areas - physical security should be present at the market places - illicit markets found in isolated areas or on blocks adjacent to arterial routes - located in apartments or single-family homes - locked-gates in apartment were likely for drug sales
Green (1995) Oakland	- Police Department arrests 1990-1992	Followed movement of 22,335 people			- w/in 3 blocks of a bar or liquor store - enforced city codes - cleaned up blight - removed abandoned autos - changing the appearance, changed the activity in the area

Reference	Data Source	Area Hot Spots	# Drug Markets	Theory	Characteristics
Weisburd and Green-Mazerolle (1995, 2000) Jersey City	- police arrest data	Intersection areas - 56 hot spots identified	- 41% of 1,553 intersect-ion areas (figure out #) - 4.4% of street sections that was 46% of NARC arrests	Broken windows	- higher population density - fewer single family homes - fewer homes owned by residents - concentration of minorities and poor people - cluster in discrete areas - street segments and intersections w/in drug hot spots were also more likely to experience crime and disorder problems compared to non-drug hot spot areas (spatial linkage not causal) - displacement (55 new drug intersections)
Lurigio et al. (1998) Cook County	NNCA cases	- randomly selected 10 abated properties and its blocks	2 locations observed	Situational factors	- gang colors and graffiti present - high population - low income status - signs of drug dealing operations - characteristics of social life - groups of people drinking in public (mostly youths) - physical decline (structures in poor/fair condition) - effective in stable or slowly declining communities - 5 African-American, 3 Puerto Rican, and 2 White neighborhoods - high concentration of large multiple-unit apartment buildings - working/middle class neighborhoods

Reference	Data Source	Area Hot Spots	# Drug Markets	Theory	Characteristics
Hope (1994) St. Louis	- CFS - time frame of 27 months	3 case studies	3 location areas	Police Oriented Policing (POP) & Situational Crime Prevention (SCP)	Case Study 1 - non-owner occupied residences / absentee landlords - standards for maintenance depreciated - on-going code violations - apartment used as drug distribution centers - racially integrated Case Study 2 - almost exclusively African-American population - 75% were single family units - deterioration of buildings: - poorly maintained (trash and garbage) and - in violation of codes - address in question was the only unit being used in a dilapidated 4-unit apt bldg; 3 units vacant - typical cfs included: drug dealing, disturbances, noise, people hanging out, drug use, and prostitution Case Study 3 - relatively poor - predominantly African-American - major population decline - vacant and insecure buildings and lots - trash and garbage

Reference	Data Source	Area Hot Spots	# Drug Markets	Theory	Characteristics
Mazerolle et al. (2000) Jersey City	Public Housing Unit	6 Public Housing Sites		CPTED, SCP, Civil Remedies	- lighting in parking lots - payphones made outgoing calls only - evictions
Eck and Wartell (1998) San Diego	All Narcotics Unit Calls 30 month period	- Residential rental locations	121 Rental Locations	R.A., Place Management	- Place managers are key - Financial position of managers not strong or unwilling 3 Groups: - Control (42) - Letter (42) - Letter and meeting (37)
Mazerolle et al. (1998a&b) Oakland	Beat Health Unit (1 street on block has drug activity)	100 Blocks - 50 - Beat Health Unit (experiment) - 50 - general patrol division (control) - 300 ft radius		Ecological Factors, R.A., Place Management	The level of the PM's collective involvement in community activism is associated with: - decrease in signs of disorder - increase in levels of signs of civil behavior in public places - At the .05 level four key conditions were found: - males selling drugs - signs of physical disorder - males at payphones - males at bus stops

Reference	Data Source	Area Hot Spots	# Drug Markets	Theory	Characteristics
Block and Block (1995) Chicago	- GeoArchive dataset - Census data - Liquor Licenses from Jan - June 1993 - 3,364 incidents	- densest concentrations (hotspot areas) of places, events occurring at those places, and incidents occurring in the surrounding areas	- 49 high-incident places v 49 low-incident places (in 2 districts)		- main diagonal streets of major intersections - many of the drug incidents were located near an elevated station or an expressway interchange, generating high traffic and offering easy access and escape with low surveillance - within a one-block radius of a liquor store: 88 drug arrests, 45 robberies, and 20 other violent crimes occurred

APPENDIX B

ENVIRONMENTAL VARIABLE CHART

Variable Chart

Phase I		
Activity Patterns		
Variable	Explanation	Citation
Arterial Routes	- clustered near arterial routes and nodes of high legitimate activities/ routine legitimate services - the arterials and nodes with illicit market places clustered around them should be in economically depressed areas - high traffic Spatial Linkage - street segments and intersections w/in drug hot spots were also more likely to experience crime and disorder problems compared to non-drug hot spot areas (spatial linkage not causal)	Eck (1994) Eck (1995) Weisburd and Green-Mazerolle (1995, 2000)
Bus stops	- males at bus stops - frequent feature in drug areas - 6 out of 10 bus stops involved drug activity	Mazerolle et al. (1998) Eck (1994) Loukaitou-Sideris (1999)

Crime Attractors		
Variable	Explanation	Citation
Liquor establishments	- 88 drug arrests within one-block radius of a liquor store - within 3 blocks of a bar or liquor store	Block and Block (1995) Green (1995)
Payphones	- males at payphones - payphones made outgoing calls only - frequent feature in drug areas	Mazerolle et al. (1998) Mazerolle et al. (2000) Eck (1994)
Housing Structure	Single Family Homes - Fewer single family homes in areas of narcotic activity Owner occupied/Rentals - fewer homes owned by the residents Apartments - drug incidents found to be in apartments - *locked-gates in apartment were likely for drug sales* - high concentration of large multiple-unit apartment buildings	Weisburd & Mazerolle (2000) Weisburd & Mazerolle (2000) Hope (1994) Eck (1994)
Social Structure		
Vacant units	- vacant lots and units provide space for illegal activity without ownership	Hope (1994)

Population density	- areas of population decline - highly populated areas	Hope (1994) Lurigio et al. (1998) Weisburd & Mazerolle (2000)
Social Economic Status/Income	- lower income levels - concentration of poor people - the arterials and nodes with illicit market places clustered around them should be in economically depressed areas - working/middle class neighborhoods - abatement projects effective in stable or slowly declining communities	Lurigio et al. (1998) Weisburd & Mazerolle (2000) Eck (1995) Lurigio et al. (1998)
Minority	- concentration of minorities - % of African-American - 50% A.A., 30% Puerto Rican, 20% white	Weisburd & Mazerolle (2000) Hope (1994) Lurigio et al. (1998)
Phase II		
Variable	Explanation	Citation
Place attachment	- high place attachment	Eck (1994)
Gangs	- gang colors and graffiti present - sense of ownership for the area, helps with the deterioration of an area	Lurigio et al. (1998)

Place Management	- provide surveillance and ownership to a building	Mazerolle et al. (1998) Eck (1994) Eck and Wartell (1998)
	- low surveillance	Block and Block (1995)
	Deterioration of buildings - poorly maintained (trash and garbage)	
	- in violation of codes	Hope (1994)
	- physical decline (structures in poor/fair condition)	Lurigio et al. (1998)
	Graffiti - deterioration of area	
	- gang colors and graffiti present	Lurigio et al. (1998)
	Abandoned Vehicles - removed abandoned autos changed the users/activity of the area	Green (1995)
	Blight - removed the blight to change the users/activity of the area	Green (1995)
	Lighting - Lighting in parking lots was poor and so flood lights were put in	Mazerolle et al. (2000)

APPENDIX C

SITE INSTRUMENT

Lexington Narcotics Project
Data Collection

Date:_____ Time:_____ Team:_____

Group #:_____ Time @ Night: _____

Location: 1. _____ 2. _____

3. _____ 4. _____

Pictures: _____

	Location #	1	2	3	4
Social Factors					
Place Attachment	People hanging around on block?				
	Furniture in the front yard?				
	Personal Identifiers (Decorative flags, fence, etc.)				
Gangs	Casual groups hanging out on street or by buildings? (Y/N)				
	Drinking alcohol? (Y/N)				
	Any colors or signs visible? (Y/N)				
Place Management	Lighting levels at Night Poor, Average, Good				
	Sign of: (Y/N)				
	Trash	T	T	T	T
	Broken windows	W	W	W	W
	Graffiti	G	G	G	G
	Abandoned vehicles	V	V	V	V
	Building type: Apartment (1), Duplex (2), (3), Condo (4), Other (5)				

REFERENCES

Barnes, G.C. (1995). Defining and optimizing displacement. In In J.E. Eck & D. Weisburd (Eds.), *Crime and Place* (pp. 95-114). Monsey, NY: Criminal Justice Press

Block, R.L. & Block, C.R., (1995). Space, place, and crime: Hot spot areas and hot places of liquor-related crime. In J.E. Eck & D. Weisburd (Eds.), *Crime Prevention Studies: Vol. 4. Crime and Place* (pp.145-184). Monsey, NY: Criminal Justice Press.

Brantingham, P.L., & Brantingham, P.J. (1995). Criminality of place: Crime generators and crime attractors. *European Journal on Criminal Policy and Research*, 3(3), 5-26.

Buerger, M. (1992). Defensive strategies of the street-level drug trade. *Journal of Crime and Justice*, 15(2), 31-51.

Clarke, R.V. & Bichler-Robertson, G. (1998). Place managers, slumlords and crime in low rent apartment buildings. *Security Journal*, 11, 11-19.

Clarke, R.V. (1997). Introduction. In R. V. Clarke (Ed.), *Situational Crime Prevention: Successful Case Studies* (2nd ed.) (pp.1-44). Guilderland, NY: Harrow and Heston.

Cohen, L.E. & Felson, M. (1979). Social change and crime rate trends: A routine activity approach. *American Sociological Review*, 44 (August), 588-608.

Eck, J.E. and Clarke, R. (2003) Classifying Common Police Problems: A Routine Activity Approach. In M. Smith and D. Cornish (Eds.), *Crime Prevention Studies:* Vol. 16. Monsey, NY: Criminal Justice Press (and Willan Publishing, UK).

Eck, J.E. and Wartell, J. (1998) Improving the Management of Rental Properties With Drug Problems: A Randomized Experiment. In L. Green Mazerolle & J. Roehl (Eds.), *Crime Prevention Studies: Vol.9. Civil Remedies and Crime prevention* (161-185). Monsey, NY: Criminal Justice Press.

Eck, J.E. (1994). Drug markets and drug places: A case-control study of the spatial structure of illicit drug dealing. *Dissertation Abstracts International*, (UMI No. 9514517).

Eck, John E. (1995). A general model of the geography of illicit retail marketplaces. In J.E. Eck & D. Weisburd (Eds.), *Crime Prevention Studies: Vol. 4. Crime and Place*. Washington DC: Criminal Justice Press.

Felson, M. (1986). Predicting crime potential at any point on the city map. In R.M. Figlio, S. Hakim, & G.F. Rengert (Eds.), *Metropolitan Crime Patterns* (pp. 127-136). Monsey, NY: Criminal Justice Press.

Green, L. (1995). Cleaning up drug hot spots in Oakland, California: The displacement and diffusion effects. *Justice Quarterly*, 12(11), 737-754.

Hirschi, T. (1969). *Causes in delinquency*. Los Angeles, CA: University of California Press.

Hope, Timothy J. (1944) Problem-Oriented Policing and Drug-Market Locations: Three Case Studies. In R.V. Clark (Ed.), *Crime Prevention Studies: Vol. 2*. Monsey, NY: Willow Tree Press, Inc.

Kelling, G.L. & Coles, C.M. (1996) *Fixing broken windows: Restoring order and reducing crime in our communities*. New York, NY: Simon & Schuster.

Loukaitou-Sideris, A. (1999). Hot spots of bus stop crime: The importance of environmental attributes. *Journal of the American Planning Association*, 65(4), 395-412.

Lurigio, A.J., Davis, R.C., Regulus, T.A., Gwiasda, V.E., Popkin, S.J., Dantzker, M.L., et al. (1998). More effective place management: An evaluation of Cook County's Narcotics Nuisance Abatement Unit. In L.

Green Mazerolle & J. Roehl (Eds.), *Crime Prevention Studies: Vol.9. Civil Remedies and Crime prevention* (187-217). Criminal Justice Press.

Mazerolle, L.G., Kadleck, C., & Roehl, J. (1998a). Controlling drug and disorder problems: The role of place managers. *Criminology*, 36(2), 371-403.

Mazerolle, L.G., Roehl, J., & Kadleck, C. (1998b). Controlling social disorder using civil remedies: Results from a randomized field experiment in Oakland, California. In L. Green Mazerolle & J. Roehl (Eds.), *Crime Prevention Studies: Vol.9. Civil Remedies and Crime prevention* (141-159). Criminal Justice Press.

Mazerolle, L.G, Ready, J., Terrill, W., & Waring, E. (2000). Problem-oriented policing in public housing: The Jersey City evaluation. *Justice Quarterly*, 17(1), 129-155.

Natarajan, M., Clarke, R.V., & Belanger, M. (1996). Drug dealing and pay phones: The scope for intervention. *Security Journal*, 7(4), 245-251.

Olligschlaeger, A.M. (1997). Artificial neural networks and crime mapping. In D. Weisburd & T. McEwen (Eds.), *Crime Prevention Studies: Vol. 8. Crime mapping and crime prevention*. Monsey, NY: Willow Tree Press, Inc.

Skogan, W.G. (1990). *Disorder and decline: Crime and the spiral of decay in American neighborhoods.* New York, NY: The Free Press.

Weisburd, D. & Green, L. (1995). Policing drug hot spots: The Jersey City drug market analysis experiment. *Justice Quarterly*, 12(4), 711-735.

Weisburd, D. & Green Mazerolle, L. (2000). Crime and disorder in drug hot spots: Implications for theory and practice in policing. *Police Quarterly*, 3(3), 331-349.

Wilson, J.Q. & Kelling, G.L. (1982, March). The police and neighborhood safety: Broken windows. *Atlantic Monthly*, 249(3), 29-38.